What You Need To Know About™

Ovarian Cancer

NATIONAL INSTITUTES OF HEALTH
National Cancer Institute

This booklet is about ovarian cancer. If you have questions, call the Cancer Information Service to learn more about this disease. The staff can talk with you in English or Spanish.

The phone number is 1–800–4–CANCER (1–800–422–6237). The number for deaf and hard of hearing callers with TTY equipment is 1–800–332–8615. The call is free.

Este folleto es acerca del cáncer de los ovarios. Si tiene preguntas, llame al Servicio de Información sobre el Cáncer para conocer más acerca de esta enfermedad. Este servicio tiene personal que habla español.

El número a llamar es el 1–800–4–CANCER (1–800–422–6237). Personas con dificultades de audición con equipo TTY pueden llamar al 1–800–332–8615. La llamada es gratis.

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U.S. DEPARTMENT OF HEALTH AND
HUMAN SERVICES
Public Health Service
National Institutes of Health

What You Need To Know About™ Ovarian Cancer

The diagnosis of ovarian cancer brings with it many questions and a need for clear, understandable answers. We hope this National Cancer Institute (NCI) booklet will help. It describes the symptoms, detection, diagnosis, and treatment of this disease. Having this important information can make it easier for women and their families to handle the challenges they face.

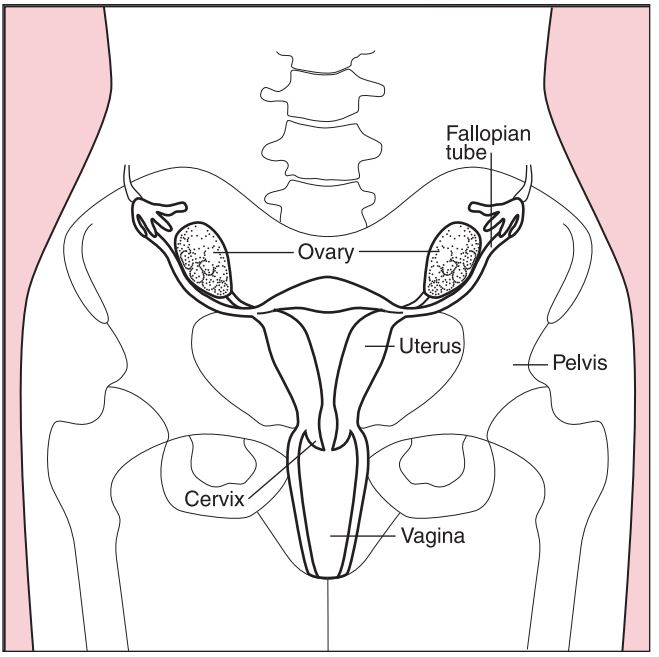
Cancer researchers continue to study and learn more about ovarian cancer. The Cancer Information Service and the other sources of NCI information listed under "National Cancer Institute Information Resources" can provide the latest, most accurate information on ovarian cancer. Publications mentioned in this booklet and others are available from the Cancer Information Service at 1–800–4–CANCER. Also, many NCI publications may be viewed or ordered on the Internet at **http://cancer.gov/publications**.

The Ovaries

The ovaries are a pair of organs in the female reproductive system. They are located in the pelvis, one on each side of the uterus (the hollow, pear-shaped organ where a baby grows). Each ovary is about the size and shape of an almond. The ovaries have two functions: they produce eggs and female hormones (chemicals that control the way certain cells or organs function).

Every month, during the menstrual cycle, an egg is released from one ovary in a process called ovulation. The egg travels from the ovary through the fallopian tube to the uterus.

The ovaries are also the main source of the female hormones estrogen and progesterone. These hormones influence the development of a woman's breasts, body shape, and body hair. They also regulate the menstrual cycle and pregnancy.



Understanding Ovarian Cancer

Cancer is a group of many related diseases that begin in cells, the body's basic unit of life. To understand cancer, it is helpful to know about normal cells and what happens when they become cancerous.

The body is made up of many types of cells. Normally, cells grow, divide, and produce more cells when the body needs them. This orderly process helps to keep the body healthy. Sometimes, however, cells keep dividing when new cells are not needed. These extra cells form a mass of tissue, called a growth or tumor. Tumors can be benign or malignant.

- **Benign tumors** are not cancer. They often can be removed and, in most cases, they do not come back. Cells in benign tumors do not spread to other parts of the body. Most important, benign tumors are rarely a threat to life.

> Ovarian cysts are a different type of growth. They are fluid-filled sacs that form on the surface of an ovary. They are not cancer. Cysts often go away without treatment. If a cyst does not go away, the doctor may suggest removing it, especially if it seems to be growing.

- **Malignant tumors** are cancer. Cells in these tumors are abnormal and divide without control or order. They can invade and damage nearby tissues and organs. Cancer cells can also spread (metastasize) from their original site to other parts of the body.

A malignant tumor that begins in the ovaries is called ovarian cancer. There are several types of ovarian cancer. Ovarian cancer that begins on the

surface of the ovary (epithelial carcinoma) is the most common type. This is the type of cancer discussed in this booklet. Ovarian cancer that begins in the egg-producing cells (germ cell tumors) and cancer that begins in the supportive tissue of the ovaries (stromal tumors) are rare and are not discussed in this booklet. The Cancer Information Service and the other NCI sources listed under "National Cancer Institute Information Resources" can provide information or suggest resources that deal with these types of ovarian cancer.

Ovarian cancer cells can break away from the ovary and spread to other tissues and organs in a process called shedding. When ovarian cancer sheds, it tends to seed (form new tumors) on the peritoneum (the large membrane that lines the abdomen) and on the diaphragm (the thin muscle that separates the chest from the abdomen). Fluid may collect in the abdomen. This condition is known as ascites. It may make a woman feel bloated or her abdomen look swollen.

Ovarian cancer cells can also enter the bloodstream or lymphatic system (the tissues and organs that produce and store cells that fight infection and disease). Once in the bloodstream or lymphatic system, the cancer cells can travel and form new tumors in other parts of the body.

Ovarian Cancer: Who's at Risk?

The exact causes of ovarian cancer are not known. However, studies show that the following factors may increase the chance of developing this disease:

- **Family history.** First-degree relatives (mother, daughter, sister) of a woman who has had ovarian

cancer are at increased risk of developing this type of cancer themselves. The likelihood is especially high if two or more first-degree relatives have had the disease. The risk is somewhat less, but still above average, if other relatives (grandmother, aunt, cousin) have had ovarian cancer. A family history of breast or colon cancer is also associated with an increased risk of developing ovarian cancer.

- **Age.** The likelihood of developing ovarian cancer increases as a woman gets older. Most ovarian cancers occur in women over the age of 50, with the highest risk in women over 60.
- **Childbearing.** Women who have never had children are more likely to develop ovarian cancer than women who have had children. In fact, the more children a woman has had, the less likely she is to develop ovarian cancer.
- **Personal history.** Women who have had breast or colon cancer may have a greater chance of developing ovarian cancer than women who have not had breast or colon cancer.
- **Fertility drugs.** Drugs that cause a woman to ovulate may slightly increase a woman's chance of developing ovarian cancer. Researchers are studying this possible association.
- **Talc.** Some studies suggest that women who have used talc in the genital area for many years may be at increased risk of developing ovarian cancer.
- **Hormone replacement therapy (HRT).** Some evidence suggests that women who use HRT after menopause may have a slightly increased risk of developing ovarian cancer.

About 1 in every 57 women in the United States will develop ovarian cancer. Most cases occur in women over the age of 50, but this disease can also affect younger women.

As we learn more about what causes ovarian cancer, we may also learn how to reduce the chance of getting this disease. Some studies have shown that breast feeding and taking birth control pills (oral contraceptives) may decrease a woman's likelihood of developing ovarian cancer. These factors decrease the number of times a woman ovulates, and studies suggest that reducing the number of ovulations during a woman's lifetime may lower her risk of ovarian cancer.

Women who have had an operation that prevents pregnancy (tubal ligation) or have had their uterus and cervix removed (hysterectomy) also have a lower risk of developing ovarian cancer. In addition, some evidence suggests that reducing the amount of fat in the diet may lower the risk of developing ovarian cancer.

Women who are at high risk for ovarian cancer due to a family history of the disease may consider having their ovaries removed before cancer develops (prophylactic oophorectomy). This procedure usually, but not always, protects women from developing ovarian cancer. The risks associated with this surgery and its side effects should be carefully considered. A woman should discuss the possible benefits and risks with her doctor based on her unique situation.

Having one or more of the risk factors mentioned here does not mean that a woman is sure to develop ovarian cancer, but the chance may be higher than average. Women who are concerned about ovarian

cancer may want to talk with a doctor who specializes in treating women with cancer: a gynecologist, a gynecologic oncologist (who focuses on cancer in women's reproductive organs), or a medical oncologist. The doctor may be able to suggest ways to reduce the likelihood of developing ovarian cancer and can plan an appropriate schedule for checkups.

Detecting Ovarian Cancer

The sooner ovarian cancer is found and treated, the better a woman's chance for recovery. But ovarian cancer is hard to detect early. Many times, women with ovarian cancer have no symptoms or just mild symptoms until the disease is in an advanced stage. Scientists are studying ways to detect ovarian cancer before symptoms develop. They are exploring the usefulness of measuring the level of CA–125, a substance called a tumor marker, which is often found in higher-than-normal amounts in the blood of women with ovarian cancer. They also are evaluating transvaginal ultrasound, a test that may help detect the disease early. The Cancer Information Service can provide information about this research.

A large-scale study, known as the PLCO (Prostate, Lung, Colorectal, and Ovarian) Cancer Screening Trial, is currently evaluating the usefulness of a blood test for the tumor marker known as CA–125 and a test called transvaginal ultrasound for ovarian cancer screening.

Recognizing Symptoms

Ovarian cancer often shows no obvious signs or symptoms until late in its development. Signs and symptoms of ovarian cancer may include:

- General abdominal discomfort and/or pain (gas, indigestion, pressure, swelling, bloating, cramps)
- Nausea, diarrhea, constipation, or frequent urination
- Loss of appetite
- Feeling of fullness even after a light meal
- Weight gain or loss with no known reason
- Abnormal bleeding from the vagina

These symptoms may be caused by ovarian cancer or by other, less serious conditions. It is important to check with a doctor about any of these symptoms.

Diagnosing Ovarian Cancer

To help find the cause of symptoms, a doctor evaluates a woman's medical history. The doctor also performs a physical exam and orders diagnostic tests. Some exams and tests that may be useful are described below:

- **Pelvic exam** includes feeling the uterus, vagina, ovaries, fallopian tubes, bladder, and rectum to find any abnormality in their shape or size. (A Pap test, a good test for cancer of the cervix, is often done along with the pelvic exam, but it is not a reliable way to find or diagnose ovarian cancer.)
- **Ultrasound** refers to the use of high-frequency sound waves. These waves, which cannot be heard by humans, are aimed at the ovaries. The pattern of

the echoes they produce creates a picture called a sonogram. Healthy tissues, fluid-filled cysts, and tumors look different on this picture.

- **CA–125 assay** is a blood test used to measure the level of CA–125, a tumor marker that is often found in higher-than-normal amounts in the blood of women with ovarian cancer.
- **Lower GI series**, or **barium enema**, is a series of x-rays of the colon and rectum. The pictures are taken after the patient is given an enema with a white, chalky solution containing barium. The barium outlines the colon and rectum on the x-ray, making tumors or other abnormal areas easier to see.

- **CT** (or **CAT**) **scan** is a series of detailed pictures of areas inside the body created by a computer linked to an x-ray machine.
- **Biopsy** is the removal of tissue for examination under a microscope. A pathologist studies the tissue to make a diagnosis. To obtain the tissue, the surgeon performs a laparotomy (an operation to open the abdomen). If cancer is suspected, the surgeon performs an oophorectomy (removal of the entire ovary). This is important because, if cancer is present, removing just a sample of tissue by cutting through the outer layer of the ovary could allow cancer cells to escape and cause the disease to spread.

If the diagnosis is ovarian cancer, the doctor will want to learn the stage (or extent) of disease. Staging is a careful attempt to find out whether the cancer has spread and, if so, to what parts of the body. Staging may involve surgery, x-rays and other imaging procedures, and lab tests. Knowing the stage of the disease helps the doctor plan treatment.

Treatment for Ovarian Cancer

Treatment depends on a number of factors, including the stage of the disease and the general health of the patient. Patients are often treated by a team of specialists. The team may include a gynecologist, a gynecologic oncologist, a medical oncologist, and/or a radiation oncologist. Many different treatments and combinations of treatments are used to treat ovarian cancer.

- **Surgery** is the usual initial treatment for women diagnosed with ovarian cancer. The ovaries, the fallopian tubes, the uterus, and the cervix are usually removed. This operation is called a hysterectomy with bilateral salpingo-oophorectomy. Often, the surgeon also removes the omentum (the thin tissue covering the stomach and large intestine) and lymph nodes (small organs located along the channels of the lymphatic system) in the abdomen.

  Staging during surgery (to find out whether the cancer has spread) generally involves removing lymph nodes, samples of tissue from the diaphragm and other organs in the abdomen, and fluid from the abdomen. If the cancer has spread, the surgeon usually removes as much of the cancer as possible in a procedure called tumor debulking. Tumor debulking reduces the amount of cancer that will have to be treated later with chemotherapy or radiation therapy.

- **Chemotherapy** is the use of drugs to kill cancer cells throughout the body. Chemotherapy may be given to destroy any cancerous cells that may remain in the body after surgery, to control tumor growth, or to relieve symptoms of the disease.

  Most drugs used to treat ovarian cancer are given by injection into a vein (intravenously, or IV). The drugs can be injected directly into a vein or given through a catheter, a thin tube. The catheter is placed into a large vein and remains there as long as it is needed. Some anticancer drugs are taken by mouth. Whether they are given intravenously or by mouth, the drugs enter the bloodstream and circulate throughout the body.

  Another way to give chemotherapy is to put the drug directly into the abdomen through a catheter. With this method, called intraperitoneal chemotherapy, most of the drug remains in the abdomen.

After chemotherapy is completed, second-look surgery may be performed to examine the abdomen directly. The surgeon may remove fluid and tissue samples to see whether the anticancer drugs have been successful.

- **Radiation therapy**, also called radiotherapy, involves the use of high-energy rays to kill cancer cells. Radiation therapy affects the cancer cells only in the treated area. The radiation may come from a machine (external radiation). Some women receive a treatment called intraperitoneal radiation therapy in which radioactive liquid is put directly into the abdomen through a catheter.

Clinical trials (research studies) to evaluate new ways to treat cancer are an important treatment option for many women with ovarian cancer. In some studies, all patients receive the new treatment. In others, doctors compare different therapies by giving the promising new treatment to one group of patients and the usual (standard) therapy to another group. Through research, doctors learn new, more effective ways to treat cancer. More information about treatment studies can be found in the NCI publication *Taking Part in Clinical Trials: What Cancer Patients Need To Know*. NCI also has a Web site at http://cancertrials.nci.nih.gov that provides detailed information about ongoing studies for ovarian cancer. Clinical trial information is also available from the Cancer Information Service by calling 1–800–4–CANCER (1–800–422–6237).

The NCI's CancerNet™ Web site provides information from numerous NCI sources, including PDQ®, NCI's cancer information database. PDQ contains information about ongoing clinical trials as well as current information on cancer prevention, screening, treatment, and supportive care. CancerNet also contains CANCERLIT®, a database of citations and abstracts on cancer topics from scientific literature. CancerNet can be accessed at **http://cancernet.nci.nih.gov** on the Internet.

Possible Side Effects of Treatment

The side effects of cancer treatment depend on the type of treatment and may be different for each woman. Doctors and nurses will explain the possible side effects of treatment, and they can suggest ways to help relieve problems that may occur during and after treatment.

- **Surgery** causes short-term pain and tenderness in the area of the operation. Discomfort or pain after surgery can be controlled with medicine. Patients should feel free to discuss pain relief with their doctor. For several days after surgery, the patient may have difficulty emptying her bladder and having bowel movements.

  When both ovaries are removed, a woman loses her ability to become pregnant. Some women may experience feelings of loss that may make intimacy difficult. Counseling or support for both the patient and her partner may be helpful.

  Also, removing the ovaries means that the body's natural source of estrogen and progesterone is lost,

and menopause occurs. Symptoms of menopause, such as hot flashes and vaginal dryness, are likely to appear soon after the surgery. Some form of hormone replacement therapy may be used to ease such symptoms. Deciding whether to use it is a personal choice; women with ovarian cancer should discuss with their doctors the possible risks and benefits of using hormone replacement therapy.

- **Chemotherapy** affects normal as well as cancerous cells. Side effects depend largely on the specific drugs and the dose (amount of drug given). Common side effects of chemotherapy include nausea and vomiting, loss of appetite, diarrhea, fatigue, numbness and tingling in hands or feet, headaches, hair loss, and darkening of the skin and fingernails. Certain drugs used in the treatment of ovarian cancer can cause some hearing loss or kidney damage. To help protect the kidneys while taking these drugs, patients may receive extra fluid intravenously.
- **Radiation therapy,** like chemotherapy, affects normal as well as cancerous cells. Side effects of radiation therapy depend mainly on the treatment dose and the part of the body that is treated. Common side effects of radiation therapy to the abdomen are fatigue, loss of appetite, nausea, vomiting, urinary discomfort, diarrhea, and skin changes on the abdomen. Intraperitoneal radiation therapy may cause abdominal pain and bowel obstruction (a blockage of the intestine).

Several NCI booklets, including *Chemotherapy and You, Radiation Therapy and You,* and *Eating Hints for Cancer Patients*, suggest ways for patients to cope with the side effects they experience during cancer treatment.

Doctors and nurses will explain the possible side effects of treatment, and they can suggest ways to help relieve problems that may occur during and after treatment.

The Importance of Followup Care

Followup care after treatment for ovarian cancer is important. Regular checkups generally include a physical exam, as well as a pelvic exam and Pap test. The doctor also may perform additional tests such as a chest x-ray, CT scan, urinalysis, complete blood count, and CA–125 assay.

In addition to having followup exams to check for the return of ovarian cancer, patients may also want to ask their doctor about checking them for other types of cancer. Women who have had ovarian cancer may be at increased risk of developing breast or colon cancer. In addition, treatment with certain anticancer drugs may increase the risk of second cancers, such as leukemia.

Emotional Support

Living with a serious disease is challenging. Apart from having to cope with the physical and medical challenges, people with cancer face many worries, feelings, and concerns that can make life difficult. They may need help coping with the emotional aspects of their disease.

In fact, attention to the emotional burden of having cancer is often a part of a patient's treatment plan. The support of the health care team (doctors, nurses, social

workers), support groups, and patient-to-patient networks can help people feel less isolated and distressed and can improve the quality of their lives. Cancer support groups provide an environment where cancer patients can talk about living with cancer with others who may be having similar experiences. Patients may want to speak with their health care team about finding a support group. The Cancer Information Service and other NCI resources listed under "National Cancer Institute Information Resources" have helpful information about locating support groups. Also, useful

information about coping with cancer is presented in many NCI fact sheets and booklets, including *Taking Time* and *Facing Forward*.

Ovarian Cancer: What the Future Holds

The National Cancer Institute is supporting and conducting research on the causes and prevention of ovarian cancer. Researchers have discovered that changes in certain genes (basic units of heredity) are responsible for an increased risk of developing ovarian and breast cancers. Members of families with many cases of these diseases may consider having a special blood test to see if they have a genetic change that increases the risk of these types of cancer. Although having such a genetic change does not mean that a woman is sure to develop ovarian or breast cancer, those who have the genetic change may want to discuss their options with a doctor. Information about gene testing is also available in the NCI publication *Understanding Gene Testing,* which can be ordered from the CIS at 1–800–4–CANCER or on the Internet at **http://cancer.gov/publications**.

National Cancer Institute Information Resources

You may want more information for yourself, your family, and your doctor. The following National Cancer Institute (NCI) services are available to help you.

Telephone

Cancer Information Service (CIS)

Provides accurate, up-to-date information on cancer to patients and their families, health professionals, and the general public. Information specialists translate the latest scientific information into understandable language and respond in English, Spanish, or on TTY equipment.

Toll-free: 1–800–4–CANCER (1–800–422–6237)

TTY (for deaf and hard of hearing callers): 1–800–332–8615

Internet

These Web sites may be useful:

http://cancer.gov

NCI's primary Web site; contains information about the Institute and its programs.

http://cancertrials.nci.nih.gov

cancerTrials™; NCI's comprehensive clinical trials information center for patients, health professionals, and the public. Includes information on understanding trials, deciding whether to participate in trials, finding specific trials, plus research news and other resources.

http://cancernet.nci.gov

CancerNet™; contains material for health professionals, patients, and the public, including information from PDQ® about cancer treatment, screening, prevention, supportive care, and clinical trials; and CANCERLIT®, a bibliographic database; and a glossary of medical terms related to cancer and its treatment.

E-mail

CancerMail

Includes NCI information about cancer treatment, screening, prevention, and supportive care. To obtain a contents list, send e-mail to cancermail@icicc.nci.nih.gov with the word "help" in the body of the message.

Fax

CancerFax®

Includes NCI information about cancer treatment, screening, prevention, and supportive care. To obtain a contents list, dial 301–402–5874 or 1-800-624-2511 from your touch-tone telephone or a fax machine hand set and follow the recorded instructions.

Questions for Your Doctor

This booklet is designed to help you work with your doctor to get the information you need to make informed decisions about your health care. In addition, asking your doctor the following questions will help you further understand your condition. To help you remember what the doctor says, you may take notes or ask whether you may use a tape recorder. Some people also want to have a family member or friend with them when they talk to the doctor–to take part in the discussion, to take notes, or just to listen.

Diagnosis

- What tests can diagnose ovarian cancer?
- Are they painful? Do they carry any other risks to my health?
- How soon after the tests will I learn the results?
- What type of ovarian cancer do I have?

Treatment

- What treatments are recommended for me?
- What clinical trials are appropriate for my type of cancer?
- Will I need to be in the hospital to receive my treatment? For how long?
- How might my normal activities change during my treatment?

Side Effects

- What side effects should I expect? How long will they last?
- Whom should I call if I am concerned about a side effect?

Followup

- After treatment, how often do I need to be checked? What type of followup care should I have?
- Will I eventually be able to resume my normal activities?

The Health Care Team

- Who will be involved with my treatment and followup care? What is the role of each member of the health care team in my care?
- What has been your experience in caring for patients with ovarian cancer?

Resources

- Are there support groups in the area with people I can talk to?
- Are there organizations where I can get more information about ovarian cancer?

The National Cancer Act, passed by Congress in 1971, made research a national priority. Since that time, the National Cancer Institute (NCI), the lead Federal agency for cancer research, has collaborated with top researchers and facilities across the country to conduct innovative research leading to progress in cancer prevention, detection, diagnosis, and treatment. These efforts have resulted in a decrease in the overall cancer death rate, and have helped improve and extend the lives of millions of Americans.

NATIONAL® CANCER INSTITUTE

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